

CUTTINGS DESCRIPTION FROM  
Corehole #3

2940' FNL X 2320' FEL  
Sec. 3, 1 T6S, R97W  
Garfield County, Colorado

Ground Elevation 8497  
Kelly Bushing 8507

LITHOLOGIC DESCRIPTION OF COREHOLE NUMBER 3  
 LOCATED 2940 FNL and 2320 FEL sec 3, T6S, R97W  
 GARFIELD COUNTY, COLORADO  
 ELEVATION OF KELLY BUSHING 8507, GROUND ELEVATION 8497

From	To	Description
0	50'	Sandstone, gray and brown, fine grained.
50'	55'	Missing.
55'	60'	Sandstone, light brown, fine grained.
60'	65'	Sandstone, white to very light brown, quartzose, some iron staining Siltstone, white.
65'	70'	Sandstone, gray to light brown, fine grained. Some Siltstone, white.
70'	75'	Sandstone, very light brown to gray, fine grained, quartz, plagioclase, vitreous black.
75'	80'	Sandstone, very light brown to gray, fine grained, some coarse crystalline calcite. Siltstone, gray.
80'	85'	Sandstone, very light brown, fine grained 50%. Limestone, gray, 30%. Siltstone, gray, 20%.
85'	90'	As above, with limestone content increasing.
90'	95'	Sandstone, very light brown, fine grained. Limestone, gray, silty.
95'	100'	Limestone, black. Sandstone, very light brown, fine grained, calcareous.
100'	105'	Sandstone, very light brown, fine grained. Limestone, black.
105'	110'	Limestone, dark gray, with black angular fragments 60%. Sandstone, very light brown, slightly calcareous 40%
110'	115'	As above.

## COREHOLE NUMBER 3

From	To	Description
115'	120'	Limestone, black, black fragments in dark gray matrix. Sandstone, very light brown, fine grained. Siltstone, gray, non-calcareous.
120'	125'	As above.
125'	130'	Sandstone, very light brown, fine grained 60%. Limestone, black 40%.
130'	135'	Sandstone, very light brown to gray, fine grained, some local iron staining and concretions 80%. Limestone, black, 20%
135'	140'	Siltstone, gray, with some sand sized particles and carbonaceous particles 95%. Sandstone, light brown, very fine grained, 5%.
140'	145'	Siltstone, gray, with some sand sized particles and carbonaceous inclusions and some pyritization, 90%. Siltstone, light gray, vuggy, 5%. Sandstone light brown 5%
145'	150'	Siltstone, light gray, with some sand sized particles, quartz, with gray clay matrix, 95%. Sandstone, brown 5%.
150'	155'	Siltstone, gray, with some sand sized particles, 100%.
155'	160'	As above.
160'	165'	Siltstone, sandy, light gray to dark gray 98%. Sandstone, very light brown
165'	170'	Siltstone, sandy, gray, 60%, sand, gray quartz, very fine grained 40%
170'	175'	Sandstone, gray, quartz, very fine grained to silt sized with gray clay matrix, 100%.

## COREHOLE NUMBER 3

From	To	Description
175'	180'	As above 100%.
180'	185'	As above, becoming more unconsolidated with depth (mostly sand) 100%.
185'	190'	Same as above, with more carbonaceous inclusions, 100%.
190'	195'	Same as above.
195'	200'	Sandstone, dark brown to dark brownish gray, fine grained with occasional veinlet of calcite, 100%.
200'	205'	Sandstone, light brown to dark brownish gray, 40%. Siltstone, light gray to dark gray, with carbonaceous inclusions, 60%.
205'	210'	Siltstone, same as above, 70%. Sandstone, same as above 30%.
210'	215'	Siltstone, same as above, 90%. Sandstone, same as above 10%.
215.	220'	Siltstone, same as above, greater than 98% Sandstone, same as above, less than 2%.
220'	225'	Siltstone, light brown to gray, 100%
225'	230'	Same as above.
230'	235'	Same as above.
235'	240'	Same as above.
240'	245'	Same as above.
245'	250'	Same as above, with some carbonaceous inclusions.
250'	255'	Same as above.
255'	260'	Same as above.
260'	265'	Siltstone, brown to gray, 85%. Marlstone, gray to brown, laminated 5%. Shale, black, 10%.

## COREHOLE NUMBER 3

From	To	Description
265'	270'	Siltstone, gray, 100%.
270'	275'	Sandstone, gray, very fine grained, 100%.
275'	280'	Sandstone, light gray to dark gray, very fine grained, 100%.
280'	285'	Sandstone, very fine grained, with trace pyritization, 100%.
285'	290'	Same as above.
290'	295'	Siltstone, gray with some carbonaceous inclusions, 100%.
295'	300'	Siltstone, gray to greenish gray, pyritic 100%.
300'	305'	Same as above.
305'	310'	Siltstone, gray, with trace of gray shale and gray and brown Marlstone 100%.
310'	315'	Sand, gray to brown, very fine grained 90%. Marlstone light brown to dark brown, 4%. Shale, black, fissile, hard, 6%.
315'	320'	Sand, same as above, 90%. Shale, gray to brown, 7%. Marlstone light brown to dark brown, 3%
320'	325'	Sand same as above, 95%. Marlstone, same as above, 5%.
325'	330'	Sand, brown to gray, 90%. Shale, black to brown, 7%. Siltstone, gray, 3%.
330'	335'	Siltstone, gray with very minor trace of pyritic siltstone and black shale, 100 %.
335'	340'	Sand, gray to brown 80%. Siltstone, gray, 15% Marlstone, greenish gray to brownish gray, 5%.
340'	345'	Sand, gray 85%. Siltstone, gray, 15%. Marlstone, trace.

## COREHOLE NUMBER 3

From	To	Description
345'	350'	Siltstone, gray, 100%.
350'	355'	Siltstone, gray, with some pyritization, 98%. Marlstone, gray to brown, 2%.
355'	360'	Siltstone, dark gray to gray, 100%.
360'	365'	Same as above.
365'	370'	Same as above.
370'	375'	Same as above.
375'	380'	Siltstone, as above, 95%. Marlstone, gray and light brown, banded, 5%.
380'	385'	Sand, white to gray, 85%. Siltstone, gray, 15%.
385'	390'	Siltstone gray, pyritic, 97% Marlstone, yellow to greenish gray, silty, 3%.
390'	395'	Siltstone, gray, 100%.
395'	400'	Siltstone, gray, with carbonaceous inclusions, greater than 98%. Marlstone, yellow to greenish gray, silty, less than 2%.
400'	405'	Shale, black to gray, 50%. Siltstone, gray to brown, 50%.
405'	410'	Siltstone, gray to light brown, 65%. Shale, gray, 35%.
410'	415'	Same as above.
415'	420'	Sand, gray, 75%. Shale, black to gray, 25%.
420'	425'	Clay and silt, black to gray, 85%. Black powdery clay and silt, 10%.
425'	430'	Same as above.
430'	435'	Same as above.

## COREHOLE NUMBER 3

From	To	Description
435'	440'	Oil Shale, brown to black carbonaceous, 100%
440'	445'	Oil shale, brown to dark brown, 75%. Shale, gray to black, 25%.
445'	450'	Same as above
450'	455'	Same as above.
455'	460'	Same as above.
460'	465'	Missing.
465'	470'	Same as above.
470'	1450'	Cored Interval.
1450'	1455'	Oil shale, dark brown, slightly varved, 50% marlstone, varved light brown to medium brown 50%.
1455'	1460'	Marlstone varved light brown to medium brown, 50% siltstone, medium gray calcareous 50%.
1460'	1465'	Siltstone, gray, calcareous, 85%, oil shale dark gray brown, 15%.
1465'	1470'	As above.
1470'	1475'	Siltstone, gray, calcareous, 70%, Marlstone light brown, 30%.
1475'	1480'	Siltstone, gray, calcareous, 100%.
1480'	1485'	As above.
1485'	1490'	Siltstone, greenish gray, calcareous, 60%; Siltstone, white, calcareous 20%; Oil shale, varved dark green brown to medium green brown, 20%.
1490'	1495'	As above.
1495'	1500'	As above.

## COREHOLE NUMBER 3

From	To	Description
1500'	1505'	Oil shale, dark brown, 40%, Marlstone, medium brown, 30%; siltstone, light gray to light brown, 30%.
1505'	1510'	Siltstone, light gray brown, calcareous 70%; Marlstone, light brown, 15%; oil shale dark brown, 15%.
1510'	1515'	As above.
1515'	1520'	Siltstone, light gray to light brown, calcareous 100%.
1520'	1525'	Marlstone, light green brown, 70%, oil shale dark brown, 30%.
1525'	1530'	As above.
1530'	1535'	Oil shale, dark brown, 60%, Marlstone, light brown, 40%.
1535'	1540'	As above.
1540'	1545'	Marlstone, light brown, slightly varved, 85% oil shale,



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From	To	Description
Core No. 1	477.0 - 512.1	Cored 35.1' Recovered 34.6' Recovery 99 %
477.0'	480.2'	Marlstone, brown to dark brown, with occasional carbonaceous inclusions; irregular bands of calcite and dolomite throughout.
480.2'	487.3'	Siltstone, gray to buff gray, dolomitic, banded parallel to bedding, local varving at 480.6', looped bedding toward the bottom of the interval, vertical fracture 480.2-482.1.
487.3'	488.4'	Siltstone, gray, massive, dolomitic.
488.4'	490.6'	Siltstone, gray to brownish gray, contorted bedding structures, dolomitic.
490.6'	497.4'	Marlstone and lean oilshale, gray to light brown, banded, disturbed bedding occasional bands and blebs of tuff, calcareous, fossil leaf at 494.1'.
497.4'	505.2'	Marlstone, silty and oil shale, very light brown to brown, local calcite and gilsonite stringers. At 504.9' a vug coated with calcite crystals, gilsonite and residual clay boxwork structures. Distorted bedding around the vug. Tuff, beds and inclusions throughout interval.
505.2'	509.5'	Oil shale, varved light brown to brown, oil shale darker on the interval 510.7-512.2'; tuffs, gray, anacitized on intervals 507.5' 508, 508.9'-509.4'
509.5'	510.0'	Missing
509.5'	512.1'	Oil Shale, varved brown to dark brown. At 509.5' vug containign gilsonite. Distortion and brecciation of breeding around vug. At 511.9' a thin stringer of anacitized tuff.
Core No. 2	Cored 512.1 - 552.2	Cored 40.1' Recovered 33.4' Recovery 83%
512.1'	516.0'	Oil shale, dark brown, massive, dolomitic.

## COREHOLE NUMBER 3

From	To	Description
516.0'	519.4'	Tuff, white, with very fine black shards throughout.
519.4'	532.5'	Oil shale, brown to dark brown, massive; thin brown tuffs, throughout interval; at 526.6 and 525.5' fractures coated with anhydrite and gilsonite; at 529.3' and 529.7' vertical fractures, tuff, shattered at 530.8'.
532.5'	545.2'	Tuff, gray to white, with inclusions of oil shale; fractures from 538.3 to 545.2'
545.2'	551.9'	Missing, this zone might actually be anywhere in the interval 540.3 to 545.2 because of the intense fracturing.
551.9'	552.2'	Breccia, black to brown, composed of oil shale and tuff.
Core No.3 Cored 552.2-661.0; Cored 58.8 Recovered 57.2' Recovery 97%		
552.2'	554.7'	Tuff, gray to light brown, irregularly bedded, porous, fractured.
554.7'	556.3'	Missing.
556.3'	559.5'	Tuff, gray, with interbedded oil shale, porous, top of interval shattered.
559.2'	569.2'	Oil shale, light brown to dark brown, massive, interval is both dolomitic and calcareous; at 560.0, vug containing, residual bladed clay structures, pyrite and dolomite crystals; vertical fractures in interval 561.6' to 562.7' contain dolomite. distorted bedding with stringers of calcite at 565.3'.
569.2'	573.0'	Tuff, grayish brown, irregularly bedded, very porous, moderately fractured.
573.0'	578.4'	Oil shale, dark brown, massive, calcareous; tuff stringers, .05' in thick, parallel bedding.

## COREHOLE NUMBER 3

From	To	Description
578.4'	584.6'	Oil shale, brown massive, calcareous, vuggy. Maximum size of vugs, 1" X 1/2", toward bottom of interval. Calcite crystals throughout interval.
584.6'	595.9'	Oil shale, varved it brown to black, calcareous, occasional vugs and tuffs.
596.9'	608.7'	Oil shale, varved light brown to brown, with interbedded tuffs, gray, irregularly bedded less than or equal to .07 thick; entire interval is calcareous.
608.7'	611.0'	As above. Fracture at 610.5 with gilsonite coating on fracture surface
Core No. 4   Cored 611.0-647.1'   Cored 36.1'   Recovered 33.9'   Recovery 94%		
611.0'	615.4'	Oil shale, light brown dolomitic, moderately fracture.
615.4'	618.0'	Oil shale, varved light brown to black, high angle fracture on interval 616.5-617.6 with gilsonite coating on fracture surface.
618.0'	624.0'	Oil shale, dark brown, massive, calcareous, bedding plane fractures with calcite coating fracture surfaces; dark banding on interval 621.0' to 622.0' due to very dark brown to black oil shale.
624.0'	629.1'	Oil shale, varved brown to light brown, calcareous, moderately fractured; vugs showing bladed clay structures, coated with gilsonite; calcite crystals at 625.8'
629.1'	632.4'	Oil shale, brown to light brown, dolomitic.
632.4'	633.9'	Oil shale, brown, vuggy and containing numerous very small crystal cavities.
633.9'	635.9'	Oil shale, varved brown to dark brown, calcareous; residual clay boxwork structure at 634.6' with gilsonite coating.

## COREHOLE NUMBER 3

From	To	Description
635.9'	637.5'	Oil shale, varved light brown to brown, calcareous, small band of anacitized tuff at 635.95' and 637.1, vug at 636.7' approximately 1.25" X 1" with calcite coating.
637.5'	639.7'	Missing - Nahcolite on adjacent surfaces.
639.7'	640.2'	Nahcolite, gray, coarsely crystalline, box-like structure containing inclusions of oil shale.
640.2	641.1	Oil shale, varved dark brown to light brown.
641.1'	643.0'	Siltstone, gray, interbedded oil shale, brown to very dark brown, calcareous
643.0'	647.1'	Siltstone, gray, oil shale, varved light brown to dark brown, disturbed bedding; vugs at 643.2' and 643.3' with crystal casts indicating nahcolite was present; at 646.6 tuff, steel gray, anacitized, irregularly bedded.
Core No. 5   Cored 647.1 - 705.3'   Cored 54.9'   Recovered 54.9'   Recovery 100%		
647.1'	653.2'	Oil shale, varved light brown to dark brown.
650.7'	653.7'	Residual clay boxwork structure with minor amounts of Nahcolite.
653.7'	656.6'	Oil shale, varved light brown to dark brown, with occasional thin stringers of tuff.
656.6'	662.15'	Oil shale, varved dark brown to light brown.
662.15'	662.2'	Tuff, pink to gray, irregularly bedded, partially analcitized.
662.2'	662.45'	Oil shale, varved, dark brown to light brown; tuff at 662.3', less than or equal to 1/2 thick.
662.45'	662.6'	Tuff, pink, irregularly bedded.

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From	To	Description
662.6'	664.4'	Oil shale, dark brown to light brown, varved with irregularly bedded tuff at 663.4'.
664.4'	665.85'	Oil shale, brown interbedded with some siltstone, gray, calcareous.
665.85'	667.4'	Oil shale, brown to very dark brown, dolomitic; at 666.7 tuff, pink to gray, less than 1/2" thick, vuggy.
667.4'	674.8'	Oil shale, varved light brown to dark brown, with 1/2" bed of analcitized tuff at 672.2'. Dark banding due to very dark brown to black oil shale scattered throughout interval varying light brown to dark brown.
674.8'	680.0'	Oil shale, varved light brown to dark brown calcareous, with occasional dark banding due to very dark brown to black oil shale.
680.0'	705.2'	Oil shale, varved light brown to dark brown, calcareous, with occasional thin pinkish tuff less than 1/2" thick and occasional blebs of tuff, very dark brown to black oil shale in zone from 698.5 to 700.2.
Core No. 6	Cored 705.2 - 764.1' Cored 58.9' Recovered 58.9' Recovery 100%	
705.2'	705.5'	Oil shale, deep brown, massive, broken up pyrite on conchoidal fractures.
705.5'	714.6'	Oil shale varved brown to dark brown, massive dolomitic, fractures parallel to bedding
714.6'	720.5'	Oil shale, varved brown to black, looped and truncated bedding, dolomitic. Tuff inclusion at 718.4'.
720.5'	726.5'	Oil shale, dark brown, massive; tuff, analcitized, 1" to 2" thick at 720.7, 722.9' 724.6', 726.0'

## COREHOLE NUMBER 3

From	To	Description
726.5'	728.6'	Oil shale, varved brown to dark brown; fractured with pyritic and anhydrite souting on fracture surfaces.
728.6'	731.0'	Oil shale, varved light brown to brown, calcareous. Regularly varved
731.0'	746.6'	Oil shale, varved light brown to dark brown grading to lighter brown at bottom of interval. Tuffs less than 1" thick at 732.0'-732.3', wavy bedded, particaly analcitized Thin tuff stringers, and blebs, analcitized at 734.3', 736.6' 737.7' 738.8' 741.1' vertical fracture 745.4' to 746.1'
746.6'	762.7'	Oil shale, dark brown grading to light brown, massive, calcareous to dolomitic; tuff, particaly anacitized, in lenses and stringers, typically 1/16" X 3/4"
762.7'	764.1'	Oil shale, dark brown grading to light brown, predominantly darker at top lightenting down, massive minor varving bedding locally slightly irregular.
Core No. 7	Cored 764.1' - 822.6'	Cored 58.5' Recovered 58.5' Recovery 100%
764.1'	778.4'	Oil shale varved brown to dark brown, dolomitic, fractures parallel to bedding, fracture surfaces contain fossil fragments and pyrite at 766.0' and 766.4'. At 771.5' gilsonite containing very small cyrstals, at 773.0' bedding plan fault. Zeolite crystals of bedding plane at 777.7'
778.4'	810.2'	Oil shale, varved brown to dark brown, dolomitic, banding due to dark brown to black oil shale on interval 785.3' - 788.0' Tuffs irregularly bedded at 787.5', 787.8; 799, 799.4', 799.8' 800.6' 803.45', all less than 2" thick, Tuff, very light brown, 1" thick on interval 808.4'-810.2' gilsonite seams 1/8"thick 788.6', 802.1' high angle fractures, coated with calcite 806.8-807.3

## COREHOLE NUMBER 3

From	To	Description
810.2'	822.6'	Oil shale, brown to dark brown, massive, calcareous Tuff at 820.2 - 820.45 carrying some gilsonite and sugary crystals of analcite.
Core No. 8 Cored 822.6 - 880.85' Cored 58.25' Recovered 58.25' Recovery 100%		
822.6'	822.7'	Oil shale, dark brown, at 822.6' <u>crystal cast</u> , possibly nahcolite, cored covered in pipe dope.
822.7'	833.5'	Oil shale, varved dark brown to light brown, calcareous, thin irregularly bedded tuff at 825.15, 825.4', 825.5' all tuff less than 1/4" thick interval 827.05' to 828.6' show banding with dark brown to black oil shale at 831.95 to 832.05 tuff, brown to very light brown, lower bedding plan irregular, lower half may contain gilsonite or oil due to darker color brown.
833.5'	834.8'	Marlstone, gray to light brown, silty, calcareous containing some oil shale, fossiliferous in lower part with aragonite as primary constituent mineral of fossil.
834.8'	835.5'	Oil shale, dark brown to light brown, massive containing some fossils.
835.5'	836.2'	Oil shale, dark brown, massive, some carbonaceous inclusions on fracture at 836.2'
836.2'	840.8'	Oil shale, dark brown to light brown, containing some silty and tuffaceous blebs; thin tuffaceous bed at 839.4 less than 1/4" or less in thickness.
840.8'	842.6'	Oil shale, varved dark brown, vertical step like fractures with gilsonite coating on fracture surfaces.
842.6'	844.4'	Oil shale, varved light brown to dark brown, varved fractured on interval from 843.4 to 844.4 again dark brown to black coating on surface (a part of same fractures indicated above).



## COREHOLE NUMBER 3

From	To	Description
844.4'	847.3'	Tuff, brown to white, extremely irregularly bedded with inclusion of oil shale. Some black inclusion resembling heavy hydrocarbon within tuff.
847.3'	853.5'	Oil shale, dark brown, massive, with occasional vertical thin stringers of dark gray clay, calcareous.
853.5'	857.7'	Oil shale, dark brown to very dark brown, massive, calcareous with occasional thin stringers of black oil shale.
857.7'	860.7'	Oil shale, varved dark brown to very dark brown, calcareous, with banding due to black oil shale.
860.7'	862.7'	Oil shale, brown, massive, calcareous.
862.7'	873.15'	Oil shale, varved brown to light brown, calcareous with occasional blebs of analcitized tuff at 866.0' tuff, irregular and discontinuously bedded, analcitized, with interbedded black oil shale.
873.15'	875.5'	Oil shale, varved light brown to dark brown, calcareous with band of dark gray to black oil shale less than 1/4 in. at 874.4.
875.5'	876.1'	Oil shale, light brown to dark brown with heavier banding of black oil shales.
876.1'	877.7'	Oil shale, varved light brown to dark brown, vug 3/4 x 1/8 at 876.95'.
877.7'	879.2'	Oil shale, varved light brown to dark brown with moderate black oil shale banding.
879.2'	880.85'	Oil shale, varved light brown to dark brown, heavy black banding black oil shale with vug containing gilsonite (3" x 1/2) at 880.65.
Core No. 9	Cored 880.85 - 840.05 Cored 59.20 Recovered 57.1' Recovery 96.5%	
880.85'	887.3'	Oil shale, dark brown, massive calcareous, with banding due to black oil shale.

## COREHOLE NUMBER 3

From	To	Description
887.3'	888.3'	Oil shale, light brown to dark brown, dolomitic, banding due to black oil shale, blebs and irregular beds of analcitized tuff at 887.4, 887.5 and 887.7.
888.3'	891.0'	Oil shale, silty, varved light brown to dark brown, calcareous.
891.0'	891.6'	Oil shale, light brown to dark brown, dolomitic banding due to dark brown to black oil shale.
891.6'	895.3'	Siltstone, gray, very thin stringer of analcitized tuff at 894.5.
895.3'	898.5'	Broken zone partially missing, siltstone, and marlstone, light gray to dark gray banded calcareous with residual boxwork on some surfaces indicating presence of nahcolite.
898.5'	898.8'	Siltstone, gray, interbedded with brown to dark brown and black, oil shale with carbonaceous inclusions.
898.8'	903.2'	Marlstone, banded light gray to dark gray with brown oil shale and thin beds of analcitized tuff less than 1/8" thick.
903.2'	906.4'	Oil shale, dark brown to light brown with interspersed black oil shale forming black bands. Irregularly bedded tuffs at 905.65, 905.8, 906.2, 906.4 showing microstructure.
906.4'	908.5'	Marlstone, silty, light pinkish gray to brown, calcareous, with dark gray shale, some carbonaceous inclusions and blebs of analcitized tuff.
908.5'	910.45'	Marlstone, oil shale, tuffs, dark gray shale, dark brown to gray interbedded dolomitic irregularly bedded wavy tuffs at 909.3, less than 3/4" thick, slumpage structure, at 909.5, small tuffs, brown with micro faulting less than 1/4" thick.

## COREHOLE NUMBER 3

From	To	Description
910.45'	910.65' <i>False Marker</i>	Tuff, black to dark brown, irregularly bedded, saturated with heavy hydrocarbon
910.65'	911.0' ✓	Oil shale, varved dark brown to black, calcareous.
911.0'	911.5'	Tuff, brown to gray, irregularly bedded, lower 1" to 2" partially analcitized, some hydrocarbon saturation.
911.5'	912.3'	Oil shale, varved dark brown to light brown, carbonaceous inclusions and banding due to black oil shale.
912.3'	914.2'	Oil shale, varved light brown to dark brown, varved with blebs of tuff at 912.3, 912.7, 912.75, all less than 1/2" thick.
914.2'	915.8'	Oil shale, varved a dark brown to light brown, calcareous with banding due to black oil shale,, tuff at 915.3 less than 1/2", bleb of analcitized tuff at 915.4 less than 3/4", bleb of tuff at 915.5 less than 1" calcareous.
915.8'	921.1'	Oil shale varved light brown to dark brown, calcareous.
921.1'	923.2'	Oil shale, light brown to dark brown, dolomitic with bedded siltstone, pinkish gray,
923.2'	923.7' ✓	Tuff, steel gray to blue gray, irregularly bedded crystallization of quartz, analcite, vuggy, very fine crystals, Mahogany Marker.
923.7'	927.0'	Oil shale, varved dark brown to light brown, irregularly bedded tuff at 927.7, vuggy, analcitized, occasional siltstone.
927.0'	928.0'	Oil shale, black, finely laminated, dolomitic, with earthy powder blue coating on fracture.
928.0'	931.2'	Oil shale, varved light brown to dark brown, calcareous with occasional interbedded siltstone.

## COREHOLE NUMBER 3

From	To	Description
931.2'	933.4'	Oil shale, varved light brown to dark brown, dolomitic, banded black oil shale, irregularly bedded partially analcitized tuff at 932.4.
933.4'	934.0'	Oil shale varved light brown to dark brown, with interbedded siltstone, gray.
934.0'	940.11'	Oil shale, very dark brown to black, dolomitic, with interbedded sequences of oil shale, dark to light brown, black oil shale exhibits fissility on fracture surface.
Core No. 10    Cored 940.1 - 980.6    Cored 40.5' Recovered 39.85' Recovery 98%		
940.1'	941.7'	Oil shale, varved dark brown to black, dolomitic, rare blebs of analcitized tuff, irregular bedded analcitized tuff 0.1' thick at 941.6', thin irregular bedded tuff at 941.1'. Top of the unit is marked by a nacholite (solution) zone or cavity.
941.7'	952.0'	Oil shale, varved dark green brown to medium green brown, oil shales within unit grade from finely varved with loop structures to more massive bedded blebby structures, blebs of tuff in the finely laminated zones are rare, tuff, analcitized 0.15' thick at 951.6, very vuggy.
952.0'	953.5'	Oil shale, varved dark green brown to light brown, dolomitic to calcareous, loop structures, rare blebs of buff siltstone.
953.5'	956.1'	Oil shale, varved medium brown, calcareous, very thin laminae of pyritized oil shale are abundant near top of unit. Minor displacement of bedding (minor fault) at 954.2.
956.1'	968.2'	Oil shale, varved dark brown, dolomitic to calcareous, oil shale grades from massive claystone blebby to finely laminated with loop structures, earthy lustre to porcelaine type luster, irregular bedded analcitized tuffs at 957.4, 958.55, 960.5, 961.0, 961.4, 961.6, 962.8, tuff at 961.0 very contorted varving from 1/4" to over 1" in thickness. Rare blebs of analcitized tuff throughout unit.

## COREHOLE NUMBER 3

From	To	Description
968.2'	969.6'	Oil shale, varved dark brown to medium green brown, calcareous, very smooth on outer core surface, irregular bedded tuff at 969.45, loop structures exist near bottom of unit
969.6'	970.2'	Oil shale, dark brown, with nahcolite, high water production has washed nahcolite badly, also nahcolite may be on the stage of being leached in situ. Box-works residual clay blades, etc.
970.2'	980.1'	Oil shale, varved dark brown to medium green brown, dolomitic to calcareous, smooth outer core surface, loop and truncated varving, fractured nahcolitic zones at 974.0. 976.0, high angle fractures with grayish blue clay film on the surfaces. At 977.0 - 978.0, 979.0 - 980.0.
Core No. 11 Cored 980.6 - 1038.0 Cored 57.4 Recovered 57.4 Recovery 100%		
980.6'	987.3'	Oil shale, varved medium green brown to light brown, calcareous to dolomitic, loop structures apparent in upper part of unit only, irregularly bedded analcitized tuff at 981.9, regular bedded tuffs 0.05 and 0.3' respectively at 984.0, 985.85, streaks and blebs of pyrite and analcitized tuff are common, fracture at 986.5 986.9 pyritized.
987.3'	997.5'	Oil shale, varved dark green brown to medium brown grading to light brown, varved to medium brown, dolomitic to calcareous, loop structures blebs of tuff common, thin irregular bedded tuff at 991.2, 992.0, zone between 995.8 - 996.6 is interbedded with vuggy and contorted siltstone.
998.6'	999.6'	Oil shale, varved dark green brown to light brown, calcareous, loop structures.
999.6'	1000.25'	Tuff, pinkish brown pods (small) where analcitized
1000.25'	1014.5'	Oil shale, varved dark green brown to light brown, slightly clacareous, tuffs at 1002.1, 1003.6, tuff at 1002.1 is 0.05' in thickness other is irregularly bedded. Zone between 1004.4-1006.0

## COREHOLE NUMBER 3

From	To	Description
		is vuggy, lower part of unit begins to grade toward siltstone. Siltstone becoming increasingly interbedded, pyrite stringers are abundant in lower unit. Tuffs at 1010.95, 1012.8 are pyritized, the tuff at 1012.8 is 0.15' in thickness, some of unit is irregular bedded with load casting etc.
1014.5'	1028.7'	Siltstone, gray to gray brown, vuggy pyritized contorted bedding characteristic, rare zones of lean light brown oil shale within unit. Spectacular pyritization along fracture at 1025.8.
1028.7'	1038.0'	Oil shale, varved dark green to medium brown, slightly calcareous to dolomitic, zones between 1028.7-1032.0 and 1034.4-1036.0', are highly contorted appear "high grade". Solution cavity collapse structures at 1029.7 and 1035.7, tuffs 0.05', 0.15' thick at 1031.3 and 1036.7 respectively. Blebs of tuff at 1031.6, and 1037.4, tuff at 1037.4 is analcitized, smaller blebs and thin stringers irregular bedded tuffs are common.
Core No 12	Cored 1038.0 - 1089.0 Cored 60.0 ft Recovered 60.0Ft. Recovery 100%	
1038.0'	1039.8'	Marlstone, light gray to light brown with siltstone, light gray and oil shale varved light to dark brown, oil shale calcareous with exception of tuffs at 1038.2, coal lense composed of plant remains, maximum thickness less than 1/2" at 1038.5 analcite layer blue gray less than 1/4" at 1039.8 - 3/10 ft. tuff layer pinkish with blue gray banding at top and middle, analcitized and whit layer at bottom also analcite.
1039.8'	1041.8'	Marlstone, light gray to dark gray, with interbedded light brown to dark brown oil shale and gray siltstone.
1041.8'	1042.0'	Nahcolite, coarsely crystalline vuggy, dark gray

## COREHOLE NUMBER 3

From	To	Description
1042.0'	1043.0'	Marlstone, varved gray to light brown, with irregularly bedded limy siltstones, numerous vugs in this zone indicate probable presence of nahcolite, zones of strong pyritization also occur within calcareous.
1043.0'	1046.6'	Marlstone, varved light brown to dark brown, dolomitic, very finely crystalline lower part turning to oil shale, dolomitic and silty.
1046.6'	1046.7'	Oil shale, varved brown to light brown calcareous.
1046.7'	1048.2'	Oil shale, varved light brown to dark brown, with interbedded black oil shales, dolomitic - at 1047.75 1-1/2" x 1" bleb composed of very rich dark brown oil shale, very soft blebs heavy hydrocarbon on exposure to sun. At 1047.95 irregularly bedded less than or equal to 3/4" of very dark brown oil shale, at 1048.1 same as above less than or equal to 1/2"
1048.2'	1050.1'	Oil shale, varved light brown to dark brown dolomitic with some interbedded siltstone.
1050.1'	1051.7'	Oil shale, dark brown to light brown varved non-effervescent.
1051.7'	1053.8'	Oil shale, varved light brown to dark brown, dolomitic siltstone, light to dark gray, interbedded with oil shale,
1053.8'	1054.95'	Oil shale, varved light brown to brown dolomitic with banding due to black oil shale.
1054.95'	1055.2'	Tuff brown, irregularly bedded analcitized in upper and lower zones.
1055.2'	1055.8'	Oil shale, varved light brown, to dark brown calcareous, black oil shale constitutes black banding, non calcareous.

## COREHOLE NUMBER 3

From	To	Description
1055.8'	1058.0'	Oil shale, varved brown to light brown, interval from 1055.8 to 1056.2 contains numerous thin interbedded gray siltstones.
1058.0'	1059.5'	Oil shale, brown, to light brown with interbedded black oil shales, calcareous, tuffs at 1058.8, 1/2 or less thick, 1058.9 3-1/2" thick (sweats heavy hydrocarbon on exposure to sun) brown, with inclusions analcitized tuff, irregularly bedded and vary in thickness.
Note: free oil (hvy. crude tar like)		
1059.5'	1058.9'	Oil shale, varved light brown to brown, calcareous, banding due to black oil, shale, tuff at 1059.55 less than 1" brownish color (sweat beads of heavy hydrocarbon on exposure to sun).
1058.9'	1060.5'	Oil shale, varved light brown to dark brown, calcareous, with interbedded black oil shale.
1060.5'	1061.6'	Oil shale, varved light brown to brown, calcareous with interbedded black oil.
1061.6'	1062.8'	Oil shale, varved light brown to dark brown, interbedded with beds of tuff analcitized at 1062.7, 1" or less in thickness blue gray to dark gray.
1062.8'	1066.6'	Oil shale, brownish gray to brown, dolomitic silty with occasional thin tuffs both analcitized and nonanalcitized, 1/2" or less in thickness.
1066.6'	1067.35'	Oil shale, varved light brown to brown with banding of black oil shales, siltstone, gray at 1066.95 with blue gray analcitized tuff at 1067.2 1-1/2" thick.
1067.35'	1068.0'	Oil shale, varved grayish brown to brown calcareous silty in top of interval.
1068.0'	1068.9'	Oil shale, varved brown to dark brown, with interbedded black oil shales, disturbed bedding.



## COREHOLE NUMBER 3

From	To	Description
1068.9'	1070.0'	Oil shale, varved brown to dark brown, chequing illite increasing in this interval, interbedded with black oil shale, tuff, dark gray to blue gray, 1/2" thick at 1069.2 and 1069.3, anacitized.
1070.0'	1074.4'	Oil shale, varved light brown to dark brown calcareous banding due to black oil shale.
1074.4'	1076.2'	Oil shale, brown to dark brown, with small interbedded siltstone vertical fracture is oozing heavy hydrocarbons.
1076.2'	1077.3'	Oil shale, brown to dark brown, dolomitic, black banding due to black oil shale, tuff, brown at 1076.8 oozing heavy hydrocarbon on exposure to sun, 1/2" thick.
1077.3'	1978.8'	Oil shale, brown to dark brown calcareous, with banding due to interbedded black oil shales calcareous.
1078.8'	1080.8'	Oil shale, varved brown to light brown, dolomitic many interbedded small tuffs, in intervals less than 1/4".
1080.8'	1083.3'	Oil shale, varved brown to dark brown, calcareous with many interbedded tuffs and siltstones,
1083.3'	1088.0'	Siltstone predominately gray with gray varving and some very light brown oil shale dolomitic.
1088.0'	1090.0'	Oil shale, varved brown to light brown, dolomitic with numerous interbedded siltstones, tuffs at 1089.0' and 1089.4'.
1090.0'	1090.8'	Siltstone gray, with minor amounts of interbedded light brown oil shale.
1090.8'	1093.8'	Oil shale, varved light brown to brown, with interbedded siltstone gray & tuff, light brown at 1091.7'
1093.8'	1098.0'	Siltstone light gray to gray with minor amounts of interbedded dark gray shale and light brown oil shale. Occasional irregularly bedded tuff.

## COREHOLE NUMBER 3

From	To	Description
Core # 13	Cored 1098 - 1157	Cored 591      Recovered 58.6      Recovery 99%
1098.0'	1098.5	Missing
1098.5'	1098.7'	Oil Shale, dark brown with residual clay structure on surface. This interval only partially rec'd indicating interval 1098.0-1098.5'. Probably consisted of nahcolite with oil shale inclusions.
1098.7'	1101.8'	Marlstone, light brown to gray, consisting of interbedded siltstones and poor grade oil shale, noncalcareous (dolomitic).
1101.8'	1105.8'	Oil shale, dark brown massive with interbedded shale, dark gray blebs of brown oil shale.
1105.8'	1106.7'	Oil Shale, brown to light brown, varved with blebs of steel gray analcitized tuff dolomitic.
1106.7'	1108.4'	Oil shale, brown to light brown, varved with interbedded silt stones gray dolomitic.
1108.4'	1110.1'	Oil shale brown to light brown, varved with interbedded gray siltstones calcareous.
1110.1'	1111.6'	Siltstone, light gray with minor amount of interbedded light brown to brown oil shale.
1111.6'	1112.3'	Oil shale, dark brown to light brown varved with analcitized tuffs less than 1/4" at 1111.65, 1111.70, 1111.95 calcareous.
1112.3'	1114.2'	Oil shale, dark brown to brown, varved noncalcareous.
1114.2'	1116.7'	Oil shale, brown to light brown varved with siltstone less than 3" at 1115.2 becoming more silty at bottom noncalcareous.

## COREHOLE NUMBER 3

From	To	Description
1116.7'	1123.8'	Predominantly siltstone, gray with bands of light to dark brown oil shale, a gray marly shale at 1118.2 less than 6" calcareous.
1123.8'	1130.8'	Oil shale, brown to light brown interbedded with gray siltstone and occasional thin stringers of analcitized tuff less than 1/8" calcareous in top 2' becoming noncalcareous below.
1130.8'	1131.9'	Oil shale, brown to light brown, varved lower 3" shows banding due to dark gray shales dolomitic.
1131.9'	1142.5'	Marlstone gray to light brown composed of interbedded siltstone, oil shale with occasional small less than 1/8" tuff 1141.7 to 1142.0 vuggy zone less than 1/2"
1142.5'	1148.2'	Oil shale, dark brown to light brown with interbedded dark gray shale forming dark band, heavy on interval 1143.4 to 1143.8 irregularly bedded soft analcitized tuff less than 1" at 1145.4", oil shale occasionally silty, noncalcareous.
1148.2'	1150.0'	Oil shale, light brown to brown varved with occasional small bleb irregularly bedded analcitized tuff less than 1/8" noncalcareous.
1150.0'	1151.1'	Siltstone, gray with bands of brown to light brown, interbedded oil shale throughout, calcareous.
1151.1'	1152.05'	Oil shale, dark brown to light brown varved with blebs of tuff less than 1/4"
1152.05'	1154.0'	Siltstone gray with interbedded oil shales all less than 1" and some analcitized tuffs, calcareous.
1154.0'	1156.0"	Oil shale, dark to light brown varved 1 1/2" siltstone at 1154.2, noncalcareous.

## COREHOLE NUMBER 3

From	To	Description
1156.0'	1157.1'	Siltstone gray with interbedded oil shale 5" in upper 1/3 of interval, calcareous.
Core # 14	Core 1157.1 - 1215.6	Core 58.6' Recovered 58.6' Rec. 100
1157.7'	1159.7'	Oil shale, (lean) varved medium grain brown to light brown, slightly calcareous analcitized tuffs at 1157.9, 1158.45, irregularly bedded and highly pyritized, tuff at 1157.9 is vuggy, thin rare interbedding of siltstone
1159.7'	1161.0'	Oil shale, medium brown, only slightly varved, calcareous rare thin stringers and streaks of pyrite.
1161.0'	1163.3'	Oil shale, varved dark brown to light brown, dolomitic, loop structures bedding truncation, very blebby with claystone, irregularly bedded tuffs less than 0.1' thick at 1162.7', 1162.8, streaks and very thin stringers of pyrite.
1163.3'	1170.75'	Oil shale, varved dark brown to medium grain brown, dolomitic grading to calcareous at very bottom part of unit, streaks of pyrite abundant loop structures, minor truncated blebby in parts, irregularly bedded tuff at 1167.8', richer zones from 1167.6 - 1168.8 and 1169.8 - 1170.75.
1170.75'	1178.4'	Siltstone, gray to light brown, slightly varved in zones, (thin interbedding of lean oil shale, slightly calcareous.
1178.4'	1180.1'	Oil shale slightly varved medium brown, slightly calcareous, abundant streaks and thin stringers of pyrite, irregular bedded tuff partially analcitized with pyrite at 1179.15.
1180.1'	1185.55'	Siltstone, gray brown, slightly varved (thin lean interbedding of oil shale, pyrite streaks and thin stringers common.

# COREHOLE NUMBER 3

From	To	Description
1185.55'	1192.5'	Oil shale, varved dark brown to medium grain brown, brown tuffs thin at 1190.3, 1190.35, 1190.5, tuff at 1192.35 is anaclitic irregularly bedded, thick tuff at 1192.35 is 0.05, plastic movement of tuff is noted as inclusion of surrounding oil shale are within the tuff "checking" of core shows increasing illite content.
1192.5'	1200.05'	Siltstone, gray, interbedded with thin slightly varved lean brown oil shale is slightly calcareous, streaks and stringers of pyrite abundant, lens of gilsonite at 1197, irregular bedded thin tuff (brown) at 1197.05.
1200.05'	1215.7'	Siltstone, gray slightly varved some interbedding of lean oil shale most noted at 1208.5 - 1209.5, this zone demonstrates checking showing higher illite content. Thin bedded gray tuffs (pyritized) at 1209.6, 1210.0, 1210.15, 1212.0 light pinkish gray irregular bedding, tuffs 0.1" thick at 1212.4, and 1213.55, slight pyritization of lighten colored tuffs, streaks of pyrite, blebs of pyrite common.
Core # 15	1215.7 to 1273.1	Core 57.4' Recovered 57.4' Recovery 100%
1215.7'	1222.0'	Siltstone, marlstone, light gray, not calcareous. Slightly varved; pyrite in varves. At 1218.95' to 1219.0' Load Cast
1222.1'	1231.4'	Very fine grained, medium gray sandstone Some varving and interbedding of more argillaceous sections, 1222.25 through 1223.4, 1225.7 thru 1226.8 Disturbed bedding.
1231.4'	1234.25'	Medium gray siltstone, some brown argillaceous bands. Some pyrite varves.
1234.25'	1239.4'	Medium gray, slightly calcareous marlstone. Some oil shale bands, light gray 1/2" thick tuff at 236.1 Some pyrite varves.

## COREHOLE NUMBER 3

From	To	Description
1239.4'	1242.2'	Sandstone light gray. Not calcareous some plastic movement of rock at 1241.9 some thin oil shale bands at 1239.4 and again at 1240.3.
1242.2'	1244.8'	Light brownish gray, slightly clacareous siltstone. Some oil shale bands scattered throughout this interval. Some pyrite varve
1244.8'	1247.9'	Siltstone medium gray Not calcareous A few scattered blebs of pyrite. Pyrite varve at 1247.1 tuffed 1/8" thick at 1246.85.
1247.9'	1250.65'	Brown gray oil shale slightly calcareous. Some pyrite varves. Some oil shale bands
1250.65'	1253.25'	Sandstone medium gray. Pyrite blebs. Some loops in bands at 1251.6 to 1251.8.
1253.25'	1259.55'	Siltstone light gray, some pyrite varves, to 1258. Many pyrite varves and pyrite blebs 1258 to 1259.5.
1259.55'	1261.6'	Siltstone-Marlstone, dark brownish gray heavily banded with oil shale some very fine, very thin beds of tuff.
1261.6'	1267.3'	Siltstone light gray, moderately calcareous. Some oil shale bands, Some blebs and varves of pyrite. 1261.2 to 1261.3 load cast of dolomite (slightly calcareous) Oil shale zone 1265 to 1266.
1267.3'	1273.1'	Siltstone, light gray. Some interbedded oil shale.
Core # 16 Core 1273.1 to 1332.35 Core 59.25 recovered 59.25 Recovery 100		
1273.1'	1278.5'	Siltstone, gray green interbedded with brown varved oil shale, the oil shale is lean where interbedded with the siltstone. The zone from 1277.0 - 1277.55 is oil shale very blebby with some loop structures and truncations lamina, following the described zone the unit grades back to interbedded siltstone and oil shale

## COREHOLE NUMBER 3

From	To	Description
1278.5'	1282.5'	Siltstone, gray to light green brown, slightly varved (thin interbedding of lean oil shale) slightly calcareous.
1282.5'	1285.35'	Oil shale, varved dark green brown to medium green brown, dolomitic, thin lamina light brown siltstone, thin irregularly bedded tuff at 1284.05.
1285.35'	1293.55'	Siltstone gray to light green brown, slightly varved (thin interbedding of lean oil shale) irregular and contorted bedding common.
1293.55'	1295.8'	Oil shale, varved dark green brown to medium green brown, dolomitic, blebby with light brown siltstone, porcelain type textures, tuff, gray, anacitized, 0.05' thick at 1294.3.
1295.8'	1301.0	Siltstone, gray brown to green brown, slightly varved (item interbedded with lean oil shale) grading to brown oil shale at the bottom of the unit).
1301.0'	1306.6'	Oil shale, varved dark brown to dark green brown, dolomitic, blebby, quite dark in zones with very regular varving, some contorted and displaced bedding, tuff at 1305.3 is irregular displaces plastic injection structure, bottom of unit shows banding as it grades to siltstone fossils on bleb plane at 1303.6 (fish-scales or bug larvae).
1306.6'	1309.6'	Siltstone, gray to brown, calcareous some contorted bedding, unit becoming massive.
1309.6'	1312.2'	Shale, gray small convoluted load casts.
1312.2'	1318.0'	Siltstone, claystone, light brown to medium brown, irregularly bedded siltstone and tuff zone at 1312.2 - 1312.6, analcitized tuff from 1312.6 - 1312.8, intraclase of claystone and blebs, of claystone, common irregular bedded tuff at 1317.95.

## COREHOLE NUMBER 3

From	To	Description
1318.0'	1312.6'	Oil shale, varved dark brown to medium green brown, elongated blebs of gray analcitized tuff as well as load casts are common.
1321.6'	1332.35'	Siltstone, claystone, gray to brown, calcareous, some slight varving (thin interbeds of lean brown oil shale). intraclase blebs of finer grain light brown siltstone common, irregularly interbedded analcitized tuff at 1329.3 between 2.3' of unit becomes more silty with obvious increase in porosity
Core # 17 Core 1332.35 - 1392.35 Core 60.00 Recovered 60.00'Recovery 100%		
1332.35'	1335.1'	Siltstone claystone, gray to brown some calcareousness, some varves pipe dope on samples 1332-35 to 1335.1 thin intervals of lean oil shale, blebs and loop structures of analcitized tuff, irregular bedding 1334.5 - 1334.6.
1335.1'	1341.15'	Oilshale, dolomitic. Dark brown to medium green brown varves.
1341.15'	1342.3'	Oil shale, calcareous medium green brown varves.
1342.3'	1342.5'	Analcite, medium hydrocarbon staining.
1342.5'	1347.4'	Siltstone, calcareous, light brown gray to green gray varves irregular bedding lobe casts 1347.2-1347.4'
1347.4'	1350.5'	Oil shale, light brown to green brown varves analcrite 1/4" wide at 1348.6 irregular bedding (lobe casts) in oil shale 1347.4-1347.9'
1350.5'	1351.1'	Siltstone, light brown to gray. Some varves, calcareous.
1351.1'	1354.9'	Sandstone, medium gray fine grained calcareous some varves, lobe casts 1352.4' 1352.8'



## COREHOLE NUMBER 3

From	To	Description
1354.9'	1358.0'	Oil shale, gray brown to dark green brown varves slightly calcareous. Irregular bedding (lobe casts) 1356.6 - 1358.0 analcite 1357.25 - 1357.4.
1358.0'	1360.8'	Sandstone fine grained, light to medium gray varves, calcareous, micaceous.
1360.8'	1364.65'	Oil shale, brown gray to green gray varves. Calcareous, analcite 1362.2-1362.3 lobe casts 1362.4-1362.75 blebs of analcite 1363-1364.
1364.65'	1373.5'	Siltstone, light gray Some medium gray varves Pyrite varve 1368.35 irregular bedding 1367 - 1368. Sericite. Rock is calcareous.
1373.5'	1376.2'	Oil shale, brown gray to green gray varves Illite present. Truncated bed at 1375.25 fossils at 1375.5 (Fern?)
1376.2'	1381.8'	Sandstone, light brown gray varves, calcareous, lobe casts 1378.0 - 1378.6'
1381.8'	1385.2'	Oil shale, mostly lean looking brown gray to green gray varves. Calcareous lobe casts 1383.0 - 1383.4 and 1383.9 - 1384.6
1385.2'	1388.2'	Siltstone light gray, Some green brown to gray brown varves. Calcareous Sericite.
1388.2'	1390.0'	Oil shale, brown green to green gray varves calcareous.
1390.0'	1392.35'	Sandstone, light gray some brown gray to green gray varves. Calcareous 1/4" analcite at 1390.50 and another analcite band 1/16 " wide at 1390.55.

Core # 18 Core 1392.35 to 1450.8 Core 58.45 Recovered 58.45 Recovery 100

1392.35'	1408.6'	Siltstone, gray to light brown, calcareous interbedded with lightly varved brown marlstone (lean oil shale) very dark high clay content interval at 1398.6-1399.8
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## COREHOLE NUMBER 3

From	To	Description
1408.6'	1413.6'	Oil Shale, dark green brown calcareous, very blebby.
1413.6'	1416.45'	Oil Shale, varved green to brown, calcareous slightly blebby.
1416.45'	1422.3'	Oil Shale, varved medium brown to green brown, calcareous, some loop structures in zones lighter in color. zone extremely dark in color has high clay content, color is not thought to be indication of good OS, black zone is at 1417.0-1419.0
1422.3'	1447.25	Oil Shale, siltstone interbedded giving banding effect, the kerogen content grades from fairly rich shale in 6-8" in zones upward to thin laminations of oil shale within thicken bands of siltstone, the entire unit is comprised of 6 separate cyclothems "spectacular bedding before motion occurs at 1437.0' best oil shale are very blebby.
1447.25'	1450.2'	Siltstone, gray calcareous, slightly varved.
1450.2'	1450.8'	Tuff, gray to brown partially analicite at irregularly bedded with gray brown siltstone.

End of Core